

Vaccine Preventable Disease Monitoring Report Measles, 2017 and 2018

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PREPARED BY POPULATION HEALTH BRANCH, SASKATCHEWAN MINISTRY OF HEALTH

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<p><u>Purpose:</u></p> <p>The Saskatchewan Ministry of Health's Population Health Branch provides routine surveillance of notifiable diseases at the provincial, Athabasca Health Authority (AHA), former regional health authority (RHA), First Nations and Inuit Health Branch - Saskatchewan (FNIHB-SK) and Northern Inter-Tribal Health Authority (NITHA) levels.</p> <p>This report presents the most recent data for reportable communicable diseases as collected by the Integrated Public Health Information System (iPHIS) and immunization coverage information as collected by Panorama. Limitations associated with these systems have been described elsewhere.</p> <p>Under <i>The Public Health Act, 1994</i> and the accompanying Disease Control Regulations, local medical health officers (MHOs) must report Categories I and II Communicable Diseases, as well as any communicable disease outbreaks to the Chief and Deputy Chief Medical Health Officers. Measles is a Category I disease.</p> <p><u>Report Features:</u></p> <p>Background Epidemiological Summary Surveillance Case Definition Case Counts by Year Case Characteristics Vaccine Coverage by AHA and former RHA</p> <p><u>Data Source:</u></p> <p>Panorama (as of April 1, 2019)</p>	<div> <div> <h2>Background</h2> <p>Measles is an acute, highly communicable disease with early symptoms of fever, cough, runny nose, mild eye inflammation and diarrhea that lasts two to four days (range one to seven days). Koplik's spots (small, red spots with bluish-white spots in the centre) may occur opposite to the second molar teeth. A few days later, a characteristic red blotchy rash appears beginning behind the ear and on the face, gradually spreading down to the trunk and then the extremities (see image, page 6).</p> <p>The time from exposure to early symptoms such as fever (incubation period) averages 10-12 days. The time from exposure to start of the rash is about 14 days (seven to 18 days).</p> <p>Measles virus is a member of the family <i>Paramyxovirus</i>, genus <i>Morbillivirus</i>.</p> <p>Measles was declared eliminated in Canada in 1998. In 2002, the World Health Organization (WHO) declared measles eliminated from the Americas (North America, Central America and South America). Measles virus is still circulating in the rest of the world.</p> <p>Measles continues to be imported into Canada by infected people travelling to Canada or by susceptible people exposed when travelling to areas where measles cases are still common or experiencing measles outbreaks. This can lead to spread in Canada, particularly in those who are unvaccinated or under vaccinated.</p> </div> <div> <h2>Immunization</h2> <p>The Saskatchewan Routine Immunization Schedule for Infants, Children and Adolescents recommends two doses of measles-containing vaccine as part of the routine childhood vaccination schedule.</p> <p>The first dose is recommended at one year (12 months) and the second dose at 18 months of age.</p> <p>Approximately 95% of people will be protected against measles after one dose of vaccine. After two doses, protection increases to 99%.</p> <p>Immunization coverage rates measure the numbers of individuals who have received the appropriate doses by a specific date or age and are a reliable indicator of the preventative measures to control the spread of disease.</p> <p>Recommended coverage rate to prevent outbreaks of measles is about 95%.</p> </div> <div> <h2>Surveillance</h2> <p>Under <i>The Public Health Act, 1994</i>, Saskatchewan health care providers are required to report cases of measles to the local medical health officer (MHO) who then reports the case to the Chief and Deputy Chief Medical Health Officers using the case definition in the Saskatchewan Communicable Disease Manual.</p> <p>Notifiable diseases may be undetected, therefore underreported, due to a number of factors including lack of contact with the health care system or inability of laboratory tests to identify the organism. Some communicable diseases occur rarely. Therefore, rates are based on small numbers of cases, which may fluctuate dramatically over time, and year to year comparisons should be interpreted with caution.</p> <p>Surveillance case definitions ensure uniform reporting to allow comparability of surveillance data. The definitions are not intended to be used for clinical or laboratory diagnosis or management of cases.</p> <p>Measles molecular epidemiology (genotyping) may be used to establish whether connections exist between concurrent measles cases or outbreaks and to indicate possible sources of importations.</p> </div> </div>
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EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARY

Measles in Saskatchewan: 2018

- No cases of measles were reported.
- No cases were reported hospitalized.

Measles in Saskatchewan: 2014 to 2018

- Sixteen cases of measles were reported in the former Regina Qu'Appelle, Prairie North and Sun Country health regions.
- The median[†] age was 11 years.
- Two cases were reported to be hospitalized.
- Of the 10 cases aged less than 20 years, all were unvaccinated including three cases too young to receive the vaccine.
- Of the six cases, aged 20 years and older, two were unimmunized, one had one dose of measles, mumps, rubella (MMR) combination vaccine and three had an undetermined history of being immunized with measles-containing vaccine.
- Transmission is believed to have occurred in health care facilities in at least six cases. Three other cases were exposed either by household contact or social contact. There is no documented exposure history on five cases.
- Among the two cases who acquired measles internationally, travel was reported to the Philippines during the incubation period.
- Genotyping was available for eight of the cases; all were genotype B3. Genotyping is an important tool for outbreak investigation.

[†]The median age divides a population into two equal groups; that is, half the people are younger than this age and half are older.

Measles Coverage in Saskatchewan: 2014 to 2018

- From 2014 to 2018, provincial coverage rates improved up to and including two years of age.
- The coverage rates based on doses received declined for children older than two years.

Table 1: Measles case counts by year

	2018	2017	2016	2015	2014	Total
Saskatchewan	0	0	0	0	16	16
Canada	N/A	N/A	13	195	419	627

N/A = not available

Table 2: Measles case characteristics, Saskatchewan 2014 - 2018

		Cases	Percent of Cases
Total		16	100
Sex	Male	5	31
	Female	11	69
	Unknown	0	0
Age	Less than 1 year	3	19
	1 - 4 years	2	13
	5 - 19 years	5	31
	20 - 49 years	6	38
	50 years and over	0	0
Hospitalized	Yes	2	13
	No	14	88
	Unknown	0	0
Immunization status for measles vaccine	2 doses	1	6
	1 dose	2	13
	0 doses	9	56
	Too young	3	19
	Unknown	1	6
Source	International	2	13
	Philippines	2	13
	Out of province	0	0
	Saskatchewan	14	88
Provincial source (n = 14)	Domestic Travel	0	0
	Epidemiologically-linked to travel case	0	0
	Epidemiologically-linked to case with unknown source	14	100
	No identified source	0	0
Genotype*	B3	8	50
	D8	0	0
	D9	0	0
	Unknown	8	50

*Laboratory analyses can identify different genotypes of measles, which may help identify whether the virus was imported or possibly related to other cases.

Table 3: Measles coverage for Saskatchewan by age, dose and year, 2014-2018

Age	Doses	2018	2017	2016 ^a	2015 ^a	2014 ^b
13 months	1	64.2%	60.9%	58.5%	59.5%	59.3%
18 months	1	86.3%	85.7%	84.4%	82.9%	84.4%
19 months	2	54.9%	49.2%	46.5%	46.5%	45.9%
24 months	1	90.6%	89.1%	88.7%	88.0%	88.4%
	2	80.6%	76.3%	76.3%	73.4%	75.9%
5 years	1	93.3%	91.6%	93.4%	91.4%	93.6%
	2	87.4%	84.8%	87.9%	84.7%	88.3%
7 years	2	90.2%	89.4%	90.2%	88.7%	91.1%
13 years	2	93.7%	93.7%	93.3%	92.8%	94.9%
15 years	2	95.1%	94.8%	94.8%	94.1%	96.0%
17 years	2	94.7%	93.8%	94.6%	95.0%	96.5%

^a Vaccine Preventable Disease Monitoring Report: Measles, 2015 and 2016 (Data source: Panorama January 12, 2017)

^b Vaccine Preventable Disease Monitoring Report: Measles, 2014 (Data source: SIMS January 16, 2015)

EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARY

Table 4: Measles vaccine coverage by Athabasca Health Authority and former health region, 2018

Jurisdiction (with former health region by Peer Group)	Immunization coverage in percent, by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years	15 years	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	64.2	86.3	54.9	90.6	80.6	93.3	87.4	90.2	93.7	95.1	94.7
Saskatchewan Health Authority	64.2	86.3	55	90.6	80.6	93.2	87.3	90.2	93.7	95.1	94.7
Peer Group A											
Regina Qu'Appelle	67.9	86.6	60.6	89.1	78.5	93.2	86.3	91	95	95.8	94.7
Saskatoon	58.4	86.5	48.2	91.3	81.4	91.4	84.9	88.1	92.5	94.9	94.8
Peer Group D											
Cypress	70.9	89.6	63.3	92.4	84.8	95.9	92.1	93.4	94.9	96.3	95.6
Five Hills	73.2	87	65.6	92.2	83.3	95.1	89.4	89.9	93.1	95.8	95.9
Heartland	68.6	89.4	66.5	93	88.7	94.3	92.9	94.5	95.7	95.9	96
Kelsey Trail	79.1	94	69.1	95.6	91.7	97.3	95.7	94.5	96.1	97.9	96
Sun Country	85	94.2	76.7	94.9	92.5	97	94.8	94.8	95.9	97	98.6
Sunrise	67.8	83.7	54.4	90.4	81.2	93.4	89	91.9	94.9	95.5	96
Peer Group F											
Athabasca Health Authority	71.4	88.5	41.4	94.4	80.6	100	94.3	100	96.7	91.7	91.3
Keewatin Yatthé	49	78.3	28.5	89.2	66.2	93.8	88.1	89.7	86	95	94.6
Mamawetan Churchill River	65.5	91.6	50.3	96.9	84	100	98	95.4	89.8	92.6	92.9
Peer Group H											
Prairie North	61.2	81.2	47.5	86.8	74.3	93.6	87.3	87.6	90.7	90.5	90.5
Prince Albert Parkland	50.4	78.9	40.8	87.3	70.4	94.6	86.4	88.9	95.2	94.6	92.8

Table 5: Measles vaccine coverage by Athabasca Health Authority and former health region, 2017

Jurisdiction (with former health region by Peer Group)	Immunization coverage in percent, by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years	15 years	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	60.9	85.7	49.2	89.1	76.3	91.6	84.8	89.4	93.7	94.8	93.8
Saskatchewan Health Authority	60.9	85.7	49.3	89.1	76.3	91.6	84.8	89.4	93.8	94.8	93.8
Peer Group A											
Regina Qu'Appelle	56.7	84.1	48.3	87	72.9	91.1	83.8	89.1	93.6	94.9	93.5
Saskatoon	60.5	85.6	45.6	89.3	77.5	90.2	82.1	87.6	93.4	94.6	93.7
Peer Group D											
Cypress	64.3	88.9	58.8	91	81.9	95.6	89.9	91.8	95.4	95.4	95.3
Five Hills	67	88.6	57.1	92	79.8	91.4	86	90.1	93.5	96.8	94.2
Heartland	68.3	91.8	59.9	93	84.5	94.9	91.1	94.9	95.6	95.8	96
Kelsey Trail	74.7	92.7	61	95.5	87.4	95.4	91.6	93.6	96.5	96.7	94
Sun Country	79.3	92.7	70.4	94.6	88.3	96.1	93.2	95.3	95.3	96.7	96.8
Sunrise	69.5	87.5	60.5	90.6	78.9	91.6	85.7	89.4	94.3	94.1	94.4
Peer Group F											
Athabasca Health Authority	52.8	88.4	36.6	97.3	73	96.7	93.3	89.6	90.2	82.6	92.5
Keewatin Yatth�	50.3	84.1	31.3	85.1	61.5	94.8	88.5	88.5	90.5	94.9	87.9
Mamawetan Churchill River	54.8	89.9	44.4	94.1	75.6	98.1	95.7	92.8	92.6	96.8	92.6
Peer Group H											
Prairie North	57.5	81.5	43.5	85.3	69.8	90.8	84.1	88.2	91.7	92.3	92.3
Prince Albert Parkland	51.7	80.4	37.9	88.4	68.1	92.5	86.1	88.8	94	93.3	93.8

- Two years of coverage data in 11 age-dose categories are provided by former RHA and Athabasca Health Authority (AHA). Yellow highlight indicates rates below the provincial coverage rate.
- As measles vaccine is recommended at 12 and 18 months, data for 13 and 19 months are shown.
- At a provincial level, coverage at 13 months increased from 2017 to 2018, from 60.9% to 64.2%.
- All provincial rates showed improvements or remained the same from 2017 to 2018.
- At 13 months of age for 2018, AHA and eight former RHAs exceeded the provincial average and four were below. At 19 months of age, six former RHAs exceeded the provincial average and AHA and six former RHAs were below.
- For 2018, the two-dose coverage rate was 46.8% higher in the 24-month age group (80.6) compared to the 19-month age group (54.9).
- In 2018, across the 11 age-dose categories, the former Prairie North RHA was below the provincial average in ten categories and the former Prince Albert Parkland and Keewatin Yatthé RHAs were below in nine categories.
- In 2018, the former Cypress, Heartland, Kelsey Trail and Sun Country RHAs were at or above the provincial average in all categories and the former Five Hills RHA was above the provincial average in nine age-dose categories.
- Coverage rates for health regions in Peer Groups F and H should be interpreted with caution (see Data Notes).

SURVEILLANCE CASE DEFINITION: SASKATCHEWAN CDC MANUAL

Respiratory and Direct Contact Measles



*The most frequent reaction to measles-mumps-rubella (MMR) immunization is malaise and fever (with or without rash) occurring 6-23 days after immunization. However, this should be determined for each case, as these reactions and the timeframe can vary (Public Health Agency of Canada, 2012).

†Confirmation of genotype is required in recently vaccinated individuals (within the past 45 days) to determine if illness is related to wild virus or vaccine-related.

‡IgM serology has the potential for false-positive findings. If the clinical presentation is inconsistent with a diagnosis of measles or in the absence of recent travel/exposure history, IgM results must be confirmed by the other listed confirmatory methods.

Most acute measles cases develop IgM after 3 days post rash onset. Therefore, a suspected measles case in which serum collected ≤ 3 days after rash onset initially tests IgM negative should have a second serum specimen collected > 3 days after onset for retesting for IgM.

Further strain characterization is indicated for epidemiologic, public health and control purposes.

Notification Timeline:

From Lab/Practitioner to Public Health: Within 48 hours.

From Public Health to Saskatchewan Health: Within 72 hours.

Public Health Follow-up Timeline: Immediate.

Case Definition (adopted from Public Health Agency of Canada, 2013)

Confirmed Case	<p>Laboratory confirmation of infection in the absence of recent immunization* with measles-containing vaccine:</p> <ul style="list-style-type: none"> isolation of measles virus from an appropriate clinical specimen <p>OR</p> <ul style="list-style-type: none"> detection of measles virus RNA[†] <p>OR</p> <ul style="list-style-type: none"> seroconversion or a significant (e.g., fourfold or greater) rise in measles IgG titre by any standard serologic assay between acute and convalescent sera <p>OR</p> <ul style="list-style-type: none"> positive serologic test for measles IgM antibody using a recommended assay[‡] in a person who is either epidemiologically linked to a laboratory-confirmed case or has recently travelled to an area of known measles activity. <p>OR</p> <p>Clinical illness in a person with an epidemiologic link to a laboratory-confirmed case.</p>
Probable Case	<p>Clinical illness</p> <ul style="list-style-type: none"> in the absence of appropriate laboratory tests <p>OR</p> <ul style="list-style-type: none"> in the absence of an epidemiologic link to a laboratory-confirmed case <p>OR</p> <ul style="list-style-type: none"> in a person who has recently travelled to an area of known measles activity.
Clinical Case	<p>Clinical illness is characterized by all of the following features:</p> <ul style="list-style-type: none"> fever of 38.3° C or greater; cough, coryza or conjunctivitis; generalized maculopapular rash for at least 3 days.

DATA NOTES

Case Data Source: The Saskatchewan Integrated Public Health Information System (iPHIS) is a provincially mandated integrated client-centered case management information system that supports public health surveillance. Confirmed cases must meet the provincial surveillance case definition.

Measles molecular epidemiology is a tool for tracking measles virus importations, establishing whether connections exist between concurrent measles cases or outbreaks, and demonstrating the absence of sustained measles transmission. Genotyping is performed by the National Medical Laboratory (NML).

There are 10 peer groups used by Statistics Canada, each identified by a letter (A to J). A peer group consists of former health regions with similar socio-economic characteristics which facilitates comparisons within a peer group. The twelve former health regions and one health authority in Saskatchewan fall into four groups identified by letters A, D, F and H. The peer groups in this report are based on Statistics Canada 2011 peer groupings and should not be compared to current Statistics Canada peer groupings (2014).

Vaccine Coverage Data Source: Panorama is a comprehensive, integrated public health information system. Of the five modules in the system, four have been implemented: vaccine inventory, immunization, investigations and outbreaks management. When fully functional, it will help public health professionals to work together to

effectively manage vaccine inventories, immunizations, investigations, outbreaks and family health. To learn more, please visit: www.ehealthsask.ca/services/panorama/Pages/default.aspx.

Most FNIHB and NITHA communities, with the exception of those in the Athabasca Health Authority (AHA), are not currently using Panorama. Therefore, immunization data for most First Nations children are missing or are incomplete. This report includes only those children with Saskatchewan health coverage and registered in Panorama under a former health region or AHA as of April 1, 2019. In other words, children with Saskatchewan health coverage and registered in Panorama under FNIHB-SK or NITHA jurisdiction are excluded (including those from FNIHB-SK and NITHA communities in AHA). This means this report does not include coverage statistics for the entire provincial or regional population.

The measles vaccine is currently administered as measles, mumps, rubella and varicella (MMRV) or measles, mumps and rubella (MMR) vaccine. Immunization coverage is based on those who turned 13, 18, 19 and 24 months, and 5, 7, 13, 15 and 17 years by December 31 in 2017 and 2018. For example, the immunization coverage for seven-year-old children in 2018 is based on clients who were born in 2011 and their immunization doses they received by their seventh birthday.